CLAIMS

1. An exposure mask for exposing an image forming layer provided on a substrate, by use of near field light leaking from adjoining openings formed in a light blocking member, characterized in that:

the light blocking film has an opening interval that is determined so that an electric field distribution at the image forming layer side of the opening to be defined as exposure light is projected on the light blocking member has a correlation with an eccentric model of electric field distribution as determined by a linewidth and a height of a pattern to be produced.

2. An exposure mask for exposing an image forming layer provided on a substrate, by use of near field light leaking from adjoining openings formed in a light blocking member, characterized in that:

a relation $K \geq (W+2T)$ is satisfied where T is the height of a pattern to be produced by use of the image forming layer, W is the linewidth of the pattern, and K is the width of the light blocking member being present between adjacent openings.

3. An exposure mask for exposing an image forming layer provided on a substrate, by use of near field light leaking from adjoining openings formed in a light blocking member, characterized in that:

a relation $D \leq (P-W-2T)$ is satisfied where T is the height of a pattern to be produced by use of the image forming layer, W is the linewidth of the pattern, P is the pitch of the pattern, and D is the width of the opening.

4. An exposure mask for exposing an image forming layer provided on a substrate, by use of near field light leaking from adjoining openings formed in a light blocking member, characterized in that:

a relation $D=\{P-W-2T(1+\alpha)\}$ is substantially satisfied where T is the height of a pattern to be produced by use of the image forming layer, W is the linewidth of the pattern, P is the pitch of the pattern, and D is the width of the opening while taking into account a process margin α after the exposure.

5. An exposure mask according to Claim 3 or 4, wherein the value of the pitch is made not

grater than the wavelength of a surface plasmon polariton wave to be produced on the basis of the light blocking member.

6. An exposure mask according to any one of Claims 1 - 5, wherein the openings of the mask have a two-dimensional shape or they are arranged two-dimensionally, with respect to a direction along the surface of the light blocking member where the openings are formed.

7. A method of designing an exposure mask for exposing an image forming layer provided on a substrate, by use of near field light leaking from adjoining openings formed in a light blocking member, characterized in that:

an opening interval of the light blocking film is determined on the basis of a linewidth and a height of a pattern to be produced by use of the image forming layer.

8. A method of manufacturing an exposure mask for exposing an image forming layer provided on a substrate, by use of near field light leaking from adjoining openings formed in a light blocking member, characterized in that:

an opening interval of the light

blocking film is determined on the basis of a linewidth and a height of a pattern to be produced by use of the image forming layer, and that, the light blocking member is subsequently processed so as to obtain the thus determined opening interval.

9. An exposure method for exposing an image forming layer provided on a substrate, by use of an exposure mask having a light blocking member with an opening and on the basis of near field light leaking from the opening, characterized by:

a step of preparing an exposure mask as recited in any one of Claims 1 - 6;

a step of approximating the near-field exposure mask and the image forming layer to each other, up to a distance not greater than a near field region; and

an exposure step for irradiating the image forming layer with exposure light through the exposure mask.

10. An exposure method according to Claim 9, wherein, where P is the pitch of a pattern to be produced by use of the image forming layer, D is the width of the opening, W′ is the linewidth, and T′ is the pattern height, through adjustment of an

exposure amount in the exposure step and of another condition or conditions, an exposure is carried out to satisfy a relation $(W'+2T') \leq (P-D)$.

11. A pattern forming method including an exposure step for exposing an image forming layer on the basis of near field light and by use of a near-field exposure mask having a light blocking member with openings having a pitch P and an opening width D, and a developing step for developing the exposed image forming layer, characterized in that:

through adjustment of an exposure amount in the exposure step and a developing condition in the developing step, a pattern having a linewidth W and a height T satisfying a relation $(W+2T) \leq (P-D)$ is produced.

12. A method according to Claim 11, wherein, where a minimum value of the height T of the pattern is determined as T" due to process after the pattern formation, a pattern having a linewidth W that satisfies a relation $W \leq (P-D-2T")$ is produced.

13. A device manufacturing method characterized by including an exposure step for

exposing a process object by use of an exposure method as recited in Claim 9, and a developing step for developing the exposed process object, wherein, after these steps, a predetermined process is conducted to the process object, whereby a device is manufactured.

14. An exposure apparatus including light irradiating means and an exposure mask, for exposing a process object provided on a substrate, by use of near field light leaking from a plurality of openings formed in a light blocking member of the mask, characterized in that:

as the exposure mask, said exposure apparatus comprises an exposure mask as recited in any one of Claims 1 - 6.